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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CRAIG, DWIN M

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 09/22/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/777,543

Applicant(s)

FURUSAWA, SHINYA

Examiner

Dwin M Craig

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3 & 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-30 have been presented for Examination. Claims 1-30 have been Examined and rejected. Claims 1-30 have been Examined and rejected.

Priority

2. The Examiner acknowledges Applicant's claim to priority to Japanese Patent Application 032355/2000 filed on 02/09/2000.

Specification

3. The incorporation of essential material in the specification by reference to a foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by an affidavit or declaration executed by the applicant, or a practitioner representing the applicant, stating that the amendatory material consists of the same material incorporated by reference in the referencing application. See *In re Hawkins*, 486 F.2d 569, 179 USPQ 157 (CCPA 1973); *In re Hawkins*, 486 F.2d 579, 179 USPQ 163 (CCPA 1973); and *In re Hawkins*, 486 F.2d 577, 179 USPQ 167 (CCPA 1973).

3.1 More specifically, the Examiner notes that on pages 3 & 4 of the Application the Applicant improperly attempts to incorporate by reference the Japanese Laid Open Patent Application (JP-A-Heisei 10-149382). Further, it would appear that this material is essential subject matter relied upon to enable Applicant's claimed limitations.

3.2 The Examiner notes that the Applicant's specification refers to item numbers on page(s) 3 & 4 that are item numbers (2, 3, 4, 5, & 6), in figures 2, 8, 11, 13 and 16, and then

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refers to these same item numbers on page 13 of the Specification with different descriptions of the same items.

3.3 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: In addition to the objections to the Specification noted in the paragraphs 3.1 and 3.2 above it is further noted that the specification has numerous grammatical errors, specifically, on page 1 in the "*Backround of the Invention*" section, is the phrase "*The present invention relates to a system and method for verifying hardware description.*" The grammatical tense is mixed in this sentence, for example a proper version of the sentence might read, "*The present invention relates to systems and methods of verifying a hardware design written in a hardware description language.*" On page 2 of the specification is the phrase, "*For example, the hardware model is described in an advanced programming language, such as C, C++, or Java, which is commonly used for development types of software.*" Another example sentence might be, "*For example, the hardware model is described using standard software development tools and advanced programming languages, such as C, C++ or Java.*" The Examiner notes that the Specification is replete with these types of errors and requires a through editing.

3.4 A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The substitute specification filed must be accompanied by a statement that it contains no new matter. (*See paragraph 3.3 for examples of problem passages in the specification*).

Claim Objections

4. **Claims 1-30** are objected to because of the following informalities: Minor grammatical errors such as in claim 1 in the claim preamble, the phrase, "*A hardware description verifying system comprising*" for example, the cited excerpt from Claim 1's preamble could be re-written to say, "*A hardware description language verification system comprising*". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 1-30** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Please see paragraphs 3.1-3.3 above in regards to the lack of enabling, essential subject matter presented in clear and concise manner.

5.1 **Claims 1-30** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant has failed to properly incorporate essential subject matter into the specification (*see paragraph 3.1 above*)

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such that an artisan of ordinary skill, at the time the invention was made, could make and/or use the invention without undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5.2 Claims 2, 12 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the Examiner what the applicant is claiming with the following claim language, "*said processor detects said source program portion in which a variable of a register type is referred to at a clock timing after substitution to said variable...*" It is unclear to the Examiner what is claimed by the phrase "*a clock timing*". The Examiner asserts that this phrase could mean, a clock timing *event*, or a clock timing *error*, or a clock timing *domain*, clarification and/or claim amendment is required.

5.3 Claims 3, 5-9, 13, 15-19, 23 and 25-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the Examiner what the applicant is claiming with the following claim language, "...*a signal list storage section;*" It is unclear to the Examiner what is claimed by the phrase "*a signal list*". The Examiner asserts that this phrase could mean, a *stimulus signal list* used in a test bench, or a *clock signal list*, providing the critical clock tree signals provided through out the circuit or a *generic signal list* describing different control logic signals being propagated throughout the logic circuit design, clarification and/or claim amendment is required.

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5.4 Claims 4, 14 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear to the Examiner how the following claim language can function, "...*said processor detects said source program portion in which substitution to a variable of a non-overwrite type is carried out...*" the Examiner is unable to determine how a variable that is *write-protected*, i.e. *non-overwrite type* can be *substituted* i.e. *overwritten* when that variable is described in the claim language as a *non-overwrite type*. It is unclear to the Examiner exactly what the *meets and bounds* of the claimed subject matter consist of, clarification and/or claim amendment is required.

Claim Interpretation

6. The Claims have been given the broadest interpretation by the Examiner. For the purposes of examination the Examiner has determined that the Applicant's claims are directed towards the verification of an electronic circuit design. Further, the Examiner notes that the claims are directed towards a comparison between a behavioral synthesis of the design being compared to a "*compiled*" version of the design, which has been programmed with a standard higher level programming language, and determining if the *behavioral* version of the design operates in the same manner as the *compiled* version of the design.

The Examiner asserts that when the Applicant is claiming, "*A hardware description verifying system*" that this system is functionally equivalent to "*a hardware description language based circuit design verification system.*"

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The Examiner asserts that when the Applicant is claiming, *"a storage unit which stores a source program for hardware description in a program language"* that this system is functionally equivalent to *"a storage unit where source code for a hardware description programming language is recorded."*

The Examiner asserts that when the Applicant is claiming, *"which detects a portion of source code program different in logic interpretation between a case of compiling said source program using a compiler and a case of behavioral synthesis"* that this method is functionally equivalent to *"determining if the timing behavior of a circuit modeled using behavioral synthesis is the same as the timing verification of the same circuit which has been modeled using a design compiler."*

The Examiner asserts that when the Applicant is claiming, *"source program"* that this is functionally equivalent to *"source code"*.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an

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international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Independent Claims 1, 11 and 21 and dependent Claims 2, 12 and 23 and dependent Claims 3, 5-9, 13, 15-19, 23 and 25-29 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Miller et al. U.S. Patent 6,026,219.

7.1 As regards independent Claims 1, 11 and 21 the *Miller et al.* reference teaches a hardware description language based circuit design verification system (**Figure 2 Item 1340, Timing Verifier, Col. 8 Lines 47-60, Col. 25 Lines 20-31**), a storage unit where source code for a hardware description programming language is recorded (**Figure 1 Item 107, Col. 5 Lines 16-18, Col. 6 Lines 51-56, Col. 8 Lines 17-22**), an output unit (**Figure 1, Item 121 or Item 124 or Item 126 or Item 127, Col. 5 Lines 20-26, Col. 5 Lines 52-64**), a processor (**Figure 1 Item 109, Col. 4 Lines 64-67, Col. 5 Lines 1-15**), which detects a portion of source code program different in logic interpretation, *in this case timing verification* (**Figure 2 Item 1340 Timing Verification Col. 8 Lines 47-57**) between a case of compiling said source program using a compiler (**Figure 2 Item 1330, Logic Synthesis Col. 9 Lines 1-2**) and a case of behavioral synthesis (**Figure 2 Item 1300, Behavioral Synthesis Col. 8 Lines 61-67**), and outputs the existence of said source program portion to said output (**Figure 4, Col. 10 Lines 28-33** *The Examiner notes that in the specification is disclosed, "Such HDL source code is the input to the synthesis process shown." And "Such a mapped circuit is the output of step 1520."*).

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7.2 As regards dependent **Claims 2, 12 and 23** the *Miller et al.* reference teaches detecting, *verifying*, “*clock timing*” of a “*register*” type (**Figure 17, Col. 21 Lines 51-61 Col. 22 Lines 1-8**).

7.3 As regards dependent **3, 5-9, 13, 15-19, 23 and 25-29** the *Miller et al.* reference discloses a signal list (**Figure 4 *input[1:0] a,b,c,x,y;***).

7.4 As regards dependent **Claims 10, 20 and 30** the *Miller et al.* reference teaches an right operand of the operator type includes a variable with substitution (**Figure 4, $r \leq a + b - c$**).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Independent **Claims 1, 11 and 21** and dependent **Claims 2, 12 and 23** and dependent **Claims 3, 5-9, 13, 15-19, 23 and 25-29** are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Gregory et al. U.S. Patent 5,937,190**.

8.1 As regards independent **Claims 1, 11 and 21** the *Gregory et al.* reference teaches a hardware description language based circuit design verification system (**Figure 1, Col. 5 Lines 15-37**), a storage unit where source code for a hardware description programming language is recorded (**Figure 2 Item 900, Col. 14 Line 62**), an output unit (**Figure 2 Item 904, Col. 7 Lines 19-25, Figure 8 Item 3840**), which detects a portion of source code program different in logic interpretation, (**Figure 1 Item 131 & 120, *Simulate function vs. Synthesize with probes* Figure 7, Figure 8, Col. 52 Lines 35-48**) between a case of compiling said source program using a

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compiler (Col. 17 Lines 12-31, *note the discussion of using compilers*) and a case of behavioral synthesis (Col. 1 Lines 15-19), and outputs the existence of said source program portion to said output (Col. 24 Lines 57-60, Figure 41 Items 5520, 5570 & 5560).

8.2 As regards dependent Claims 2, 12 and 23 the *Gregory et al.* reference teaches substitution of a variable of a register type (Figure 57 Item 5910, Figure 59 Figure 60 Item 6102).

8.3 As regards dependent 3, 5-9, 13, 15-19, 23 and 25-29 the *Gregory et al.* reference discloses a signal list (Figure 32 "*signal new_level: bit_vector(1 downto 0);*").

8.4 As regards dependent Claims 10, 20 and 30 the *Gregory et al.* reference teaches a right operand of the operator type includes a variable with substitution (Figure 18, *Z<= not (A or B)*) and Figure 48 Editor 2 listing lines 324-327).

Conclusion

9. The Action is **NON-FINAL**. Claims 1-30 have been Examined and rejected.

9.1 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwain M Craig whose telephone number is 703 305-7150. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 703 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DMC



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